

Amendments to the Claims

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (currently amended) A natural gas liquid plant, comprising:

a separator that is configured to allow separation of a cooled low pressure feed gas at about feed gas pressure into a liquid portion and a vapor portion, and a first pressure reduction device that is configured to receive the liquid portion and to allow reduction of pressure of the liquid portion to provide refrigeration for a first cooler that is fluidly coupled to the separator and that is configured to allow cooling of a low pressure feed gas to thereby allow formation of the cooled low pressure feed gas;

a second cooler and a second pressure reduction device fluidly coupled to the separator, wherein the second cooler is configured to allow cooling of at least part of the vapor portion, and wherein the second pressure reduction device is configured to reduce pressure of the part of the vapor portion to a degree effective to provide the part of the vapor portion to an absorber as lean absorber reflux; and

wherein the absorber is configured to produce an absorber overhead product to thereby provide refrigeration for the second cooler, and wherein the absorber is further configured to produce an absorber bottoms product, and a demethanizer fluidly coupled to the absorber and configured to receive the absorber bottoms product as lean reflux.

2. (currently amended) The natural gas liquid plant of claim 1 wherein the low pressure feed gas has a pressure of about 300 psig to about 1000 700 psig.
3. (previously presented) The natural gas liquid plant of claim 1 further comprising a plurality of side reboilers that are thermally coupled to the demethanizer and that are configured to cool a portion of the low pressure feed gas.

4. (previously presented) The natural gas liquid plant of claim 1 wherein the first pressure reduction device comprises a hydraulic turbine, and wherein the second pressure reduction device comprises a Joule-Thomson valve.
5. (previously presented) The natural gas liquid plant of claim 1 wherein the demethanizer is configured to receive the liquid portion that is reduced in pressure as a demethanizer feed stream.
6. (previously presented) The natural gas liquid plant of claim 1 further comprising a turboexpander that is configured to allow expansion of part of the vapor portion, and further comprising a second separator that is configured to receive the expanded part of the vapor portion and to produce a liquid that is employed as a lean demethanizer reflux and a vapor that is fed into the absorber.
7. (original) The natural gas liquid plant of claim 1 wherein ethane recovery is at least 85 mol% and propane recovery is at least 99 mol%.
8. (canceled).
9. (currently amended) A natural gas liquid plant, comprising:
 - a primary and secondary cooler that are configured to cool a low pressure feed gas, and a separator that is configured to separate the cooled low pressure feed gas at about feed gas pressure in a liquid portion and a vapor portion;
 - a first pressure reduction device that is configured to reduce pressure of the liquid portion to thereby provide refrigeration for the secondary cooler;
 - a third cooler that is configured to cool at least part of the vapor portion, and a pressure reduction device that is configured to expand the cooled vapor portion; and
 - an absorber that is configured to receive the cooled and expanded vapor portion and to produce an overhead product that provides refrigeration for the third cooler and a bottom product that is employed as reflux in a demethanizer.

10. (currently amended) The natural gas liquid plant of claim 9 wherein the low pressure feed gas is at least partially dehydrated and has a pressure of between about 300 psig and about 1000 700 psig.
11. (previously presented) The natural gas liquid plant of claim 9 wherein the first pressure reduction device comprises a hydraulic turbine and wherein the second pressure reduction device comprises a Joule-Thomson valve.
12. (previously presented) The natural gas liquid plant of claim 9 further comprising a plurality of side reboilers that are thermally coupled to the demethanizer and that are configured to cool a portion of the low pressure feed gas.
13. (previously presented) The natural gas liquid plant of claim 9 further comprising a turboexpander that is configured to expand part of the vapor portion and a second separator that is fluidly coupled to the turboexpander and that is configured to produce a liquid that is employed as a lean demethanizer reflux and a vapor that is fed into the absorber.
14. (previously presented) The natural gas liquid plant of claim 9 wherein the primary cooler is configured to employ at least one of external ethane, external propane, and the absorber overhead product as a refrigerant.
15. (original) The natural gas liquid plant of claim 9 wherein ethane recovery is at least 85 mol% and propane recovery is at least 99 mol%.
16. (currently amended) A natural gas liquid plant that comprises a separator that is configured to receive a cooled low pressure feed gas at about feed gas pressure and that is fluidly coupled to an absorber and a demethanizer, wherein the plant is further configured such that refrigeration duty of the absorber and demethanizer are provided at least in part by expansion of a liquid portion of the cooled low pressure feed gas from the feed gas pressure and an expansion of a vapor portion from the feed gas pressure using a device other than a turboexpander, and wherein the demethanizer is configured to receive the expanded liquid portion as demethanizer feed.

17. (previously presented) The natural gas liquid plant of claim 16 further comprising a cooler that is configured to further cool the cooled low pressure feed gas using an expanded liquid portion of the cooled low pressure feed gas as a refrigerant.
18. (previously presented) The natural gas liquid plant of claim 16 wherein the absorber is configured to produce an absorber bottom product that is fed to the demethanizer as reflux.
19. (previously presented) The natural gas liquid plant of claim 16 wherein the separator is configured to separate a vapor portion from the cooled low pressure feed gas and wherein Joule-Thomson valve is configured to further cool a first part of the vapor portion for introduction into the absorber.
20. (previously presented) The natural gas liquid plant of claim 19 further comprising a turboexpander that is configured to expand and cool a second part of the vapor portion.